

REMARKS

Claims 1-7 and 10-18 were presented for examination. By the aforementioned Office Action , the claims were rejected under 35 U.S.C. §103 as being unpatentable over Fujii (U.S. Patent 6,023,414) in view of Applicant's Figures 1-5. By this response, claims 1 and 10-12 have been amended to more particularly and distinctly point out Applicant's invention, and new claims 19 and 20 have been added. Support for the amendment and for the new claims is found in the originally filed specification. No new matter is added. For the reasons set forth below, reconsideration is respectfully requested.

Amended claim 1 is particularly directed to a novel circuit board assembly having a planar circuit board, a planar substrate mounted on a major surface of the circuit board and extending beyond a side surface of the circuit board, and an optical transceiver module mounted on the substrate. A functional front of the optical transceiver module is generally perpendicular to the major surface and faces away from the planar circuit board, and light is transmittable and receivable through the functional front.

Fujii discloses an arrangement for mounting a display device to a motherboard. The display device comprises a plurality of light sources mounted on a substrate and a reflecting case having window holes each at a location corresponding to one of the light sources. The surface of the display device on which the window holes are formed defines a functional front of the display device from which light signals emitted by the light sources are viewable. When mounted in this manner, the display device lies flat on the substrate. The substrate is mounted to the motherboard with the reflecting case of the display device received in a through hole of the motherboard such that the functional front is *substantially parallel to* a major surface of the motherboard.

The functional front of the optical transceiver module in Applicant's claim 1 is *perpendicular* to the major surface of the circuit board. Fujii therefore does not disclose all features of claim 1.

Applicant submits that a person skilled in the art would not be motivated to rearrange or replace the display device in Fujii with Applicant's optical transceiver module mounted in a manner according to claim 1. When mounting an optical transceiver module according to the arrangement of Fujii in place of the display device, the functional front of the optical transceiver module *would be facing at least one of the side walls* of the mother board that define the through hole in the motherboard. Consequently, light that is transmittable and receivable through the functional front of the optical transceiver module would be partially blocked by at least one side wall. Such an arrangement would be impractical, and therefore actually teaches away from the subject matter of claim 1. Simply replacing the display device in Fujii with an optical transceiver module does not result in a functional front of the optical transceiver module that *faces away* from the motherboard as recited in claim 1. To arrive at Applicant's invention according to claim 1, at least a portion of the printed circuit board in Fujii would have to be removed to create an opening for the functional front of the optical transceiver module to face away from the printed circuit block so as not to be blocked. No suggestion of doing this is found in Fujii.

Applicant therefore submits that Fujii, when taken alone, does not disclose, teach or suggest Applicant's optical transceiver module having a functional front that is *perpendicular* to a major surface of a planar circuit board and that *faces away* from the planar circuit board. It is therefore submitted that claim 1 is allowable over Fujii.

The prior art as set forth in Applicant's Figures 1-5 discloses optical transceiver modules that are directly mounted to a main printed circuit board (PCB). Such an arrangement is different than the substrate to which the optical transceiver module is mounted as in claim 1. Applicant submits that a skilled person would not be motivated to combine the teachings of the prior art and Fujii to arrive at Applicant's invention. There must be something in the prior art as a whole to suggest

the desirability, and thus the obviousness, of making the combination. Such is not the case here – there is nothing to suggest any desirability of combining the device of Fujii with the devices shown in Applicant's Figures 1-5.

For the foregoing reasons it is submitted that claim 1 is now allowable.

For the same reasons it is submitted that dependent claims 2-7 and 13-18, and independent claims 10, 11 and 12, are allowable.

New claim 19 recites lenses having apexes that define the functional front of the optical transceiver module, the apexes being substantially planar with the extended portion of the planar substrate. This extended portion shields and protects the lenses of the optical transmitter module from being damaged. The edge of the extended portion also serves as an alignment surface when mounting the printed circuit board in a housing of an electronic device. Such a substrate feature is not disclosed, taught or suggested in the references. Therefore it is submitted that claim 19 is allowable.

New claim 20 recites castellated electrical terminals defined at an edge of the optical transceiver module, these being electrically connected to the electrically conductive interconnects by solder joints. These castellated electrical terminals allow the optical transceiver module to be more firmly mounted on the substrate. Fujii and Applicant's Figures 1-5 do not, either singly or in any combination, teach, disclose or suggest such a structure, and therefore it is submitted that claim 20 is allowable over the references.

In view of the foregoing, it is respectfully submitted that the grounds for the Examiner's rejections have been overcome and claims 1-7 and 10-20 should be found to be in condition for allowance.

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Respectfully submitted,

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MARKED-UP COPY OF CLAIMS 1, 10, 11 and 12

1. A circuit board assembly comprising:
a planar circuit board having a major surface and a side surface,
a planar substrate mounted on the major surface of the circuit board, an
extended portion of the planar substrate extending beyond the side surface, and
an optical transceiver module mounted on the extended portion of the
substrate adjacent the side surface of the printed circuit board, a functional front of the
optical transceiver module generally perpendicular to the major surface and facing
away from the planar circuit board, light being transmittable and receivable through
the functional front.
10. A circuit board assembly comprising:
a planar circuit board having a major surface, and a side surface defining a
recess,
a planar substrate mounted on the major surface of the circuit board, an
extended portion of the planar substrate extending over the recess, and
an optical transceiver module having a functional front through which light is
transmittable and receivable, the optical transceiver module being mounted on the
extended portion of the substrate so as to be disposed in the recess with the functional
front generally perpendicular to the major surface of the planar circuit board and
facing away from the planar circuit board.
11. An optical transceiver module package for mounting on a planar circuit
board having a major surface and a side surface, the major surface provided with
electrical terminals, the optical transceiver module package comprising:
a planar substrate for mounting on the major surface of the circuit board so
that an extended portion of the planar substrate extends beyond the side surface,
an optical transceiver module provided with electrical terminals and a
functional front through which light is transmittable and receivable, and the optical
transceiver module being mounted on the extended portion of the substrate adjacent
the side surface of the printed circuit board such that the functional front is generally

perpendicular to the major surface of the planar circuit board and faces away from the planar circuit board, and

electrically conductive interconnects associated with the planar substrate for coupling the electrical terminals on the optical transceiver module with electrical terminals on the planar circuit board.

12. An optical transceiver module package for mounting on a planar circuit board having a major surface and at least one side surface defining a recess, the major surface provided with electrical terminals, the optical transceiver module package comprising:

a planar substrate for mounting on the major surface of the circuit board so that an extended portion of the planar surface extends over the recess, and

an optical transceiver module provided with electrical terminals and a functional front through which light is transmittable and receivable, the optical transceiver module being mounted on the extended portion of the substrate so as to be disposed in the recess with the functional front generally perpendicular to the major surface of the planar circuit board and facing away from the planar circuit board, and

electrically conductive interconnects associated with the planar substrate for coupling the electrical terminals on the optical transceiver module with electrical terminals on the planar circuit board.